CHASE ECONOMETRIC ASSOCIATES, INC.

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PHASE II OF

THE ECONOMIC IMPACTS OF MEETING EXHAUST EMISSION STANDARDS, 1971-1980

PART THREE

THE ECONOMIC IMPACT OF POLLUTION ABATEMENT

PREPARED FOR

THE COUNCIL ON ENVIRONMENTAL QUALITY

BY

CHASE ECONOMETRIC ASSOCIATES, INC.

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I. Cost Increases

For the purposes of this study we shall take as given the methods to be employed in meeting the government imposed exhaust emission standards of the 1970's. The CEQ has supplied CEAI with data (see Tables 3-1 and 3-2) enumerating the items to be installed to meet the various standards, any concomitant design or operating changes in the motor vehicles necessitated by the installation of these devices, and estimates of the per unit incremental production and operating costs resulting from both of the above sources.

The CEQ has made the working assumption that the methods and associated costs presented above are invariant across manufacturer, size or price category of automobile, plant or scale of production, or any other potentially relevant variable. This assumption is quite severe and is likely to be at variance with the course of future events especially if we attach any importance to the statements emanating from such sources as American Motors Corp., EPA, UAW, and the U.S. Congress.

Laying aside the issue of costs for a moment, there seems to be some real question as to whether American Motors and other low volume auto producers will be able to meet the 1975-6 standards if they are forced to rely solely upon their own research and development efforts, American Motors is currently purchasing the R and D help it needs from GM under a one year consulting agreement negotiated under an exemption (until March 19, 1972) - grudgingly granted by the Justice Department - to a 1969 consent decree forbidding the members of the U.S. auto industry from continuing a cross-licensing agreement through which they had been sharing each other's technological advances in the pollution control area. If we take Chairman Ruckelshaus' statement of May 6, 1971 literally-

> "...It is my present judgment that the required determinations relating to technological feasibility do not permit me to suspend an emission standard in favor of a single applicant or group of applicants, if technical knowledge exists, in the industry or elsewhere, which would enable any member of the industry to mass produce a light duty motor vehicle in compliance with the Act."

We can then foresee the possibility that AMC and others may not be able to sell to the U.S. market at any price in 1975 and later years. Some observers place Chrysler in the same position as AMC, giving only Ford and GM, among the domestic producers, good chances of meeting the emissions standards on the basis of their own R&D efforts. A bill is now before Congress to grant all the auto companies an exemption to the consent decree mentioned above. The potential employment effects of this situation have not been lost on the UAW, as evidenced by Mr. Woodcock's repeated statements in favor of the granting of such an exemption.

Even if all smaller companies are able to meet the standards, however, it

is by no means clear that it would be with the same resulting increase in per unit production costs as that experienced by GM. It has been suggested by some that unless AMC is soon assured of GM's continued assistance in this area through 1975, that it simply will be unable to manufacture engines clean-burning enough to meet the 1975 standards, forcing AMC to buy its engines from either GM or Ford, and to close its own engine plants. Industry observers feel that this would raise AMC's costs to a level at which they would be forced to leave the automobile industry completely. The above comments should be borne in mind when interpreting all of the results of this section, especially the profit forecasts for the Big Four.

Laying the above issues permanently aside, we return to the issue of how we will handle the cost increases listed in Tables 3-1, 3-2. Looking first at the model years 1967 through 1972, it is clear that the cost increases, both investment and operating, have already been included in observed transactions prices. Thus whatever impact these cost increases have had on sales of model year 1967 through 1971 cars and will have on 1972 model year sales is already reflected in our baseline estimates.

Look now at the column "Cost Per New Vehicle (Dollars)" of Table 3-1 for the years 1973 through 1977. We make the assumption that the cost of production of each and every automobile produced (both domestically and elsewhere) is increased by these dollar amounts over what it would otherwise be. With respect to the entries for 1975 and 1976-77, we will make 3 alternative runs to reflect uncertainties in these estimates: the costs as given, +30%, and -30%.

Look now at Table 3-2 which lists the additions to operating and maintenance costs. With respect to the entries for the years 1968 through 1972 the comments of the above paragraph apply again. The issue of increased fuel use is a difficult one to handle both theoretically and empirically. Consider, for example, the following issues:

-Automobile engines are being redesigned to run on low octane gasoline. Low octane gasoline has a lower price per gallon than does high octane gasoline (expecially if the high octane gasoline must be produced without the use of lead additives). This lower price per gallon may more than offset the decreased mileage per gallon.

-If gasoline mileage is poorer, just as many people may continue to buy cars but merely drive them fewer miles per year. The reduced miles per year may or may not tend to make people delay trading their cars in for an additional model year.

-The changes in mileage surely vary across categories of cars and may result in buyers switching among categories.

In view of the above and many similar issues it is not surprising that we have not been able to reject on either statistical or theoretical grounds the hypothesis that for this range of additions to operating costs the response of new car purchases is negligible.

Table 3-1

ESTIMATED INVESTMENT COSTS FOR ALTERNATIVE MOBILE SOURCE EMISSION CONTROLS 1967-1977

Autos and Light Duty Trucks

Model Year	Controls Added	Cost Per New Vehicle (Dollars)	Cumulative Costs (Dollars)
1967	None	0.00	0.00
1968-69	Closed PCV system (above cost of open system). Carburetor changes. Ignition timing changes. Inlet air temperature control.	5.40	5.40
1970	Additional carburetor changes. Idle control solenoid. Ignition timing changes.	7.40	12.80
1971	Evaporative emission control. Improved idle control solenoid with overheat protection (above '68-'70 costs) including transmission spark control. Lower compression ratios. Additional carburetor changes.	19.70	32.50
1972	Valve and valve seat changes for unleaded gasoline.	2.00	34.50
1973-74	Exhaust gas recirculation for NO_x control, fixed orifice system. Speed controlled spark advance.	48.00	82.50
1975	Catalytic oxidation of exhaust HC and CO (includes long-life exhaust system). Unitized ignition systems for 50,000 mile service-free performance. Air injection for catalytic unit needs.	164.00	246.50
1976-77	Dual catalyst units for HC, CO oxidation and NO_x reduction (additional cost above previous controls which are supplanted). Modified manifold reactors to reduce catalyst load.	105.00	351.50

Table 3-2

CUMULATIVE ADDITIONS TO OPERATING AND MAINTENANCE COST FOR AUTOS (PER AUTO PER YEAR)

Cost Type	Model Year									
	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
Increased Fuel Use[1]				15.90	15.90	21.50	21.50	40.60	40.60	40.60
Maintenance[2]	6.10	6.10	6.10	12.70	12.70	15.50	15.50	50.10	60.40	60.40
Maintenance Offsets[3]								-36.30	-36.30	-36.30
Total Operating and Maintenance	6.10	6.10	6.10	28.60	28.60	37.00	37.00	54.40	64.70	64.70

1/ Assume 6% penalty beginning in 1971, an additional 2% beginning in 1973 and an added 7% loss beginning in 1975.

2/ Required to enable auto to meet exhaust standards for a full 50,000 miles.

3/ Offsets for reduced requirements for present type tune-ups and exhaust system maintenance.

With respect to the additions to maintenance costs required to keep the auto in compliance with the standards for a full 50,000 miles, the following issues cannot be ignored. There is no reason whatsoever to expect the auto owner to voluntarily incur the expense of keeping his car in compliance with the standards. For support for this contention we need only look at the lack of response of motorists to the current availability of non-leaded gasoline. This is not to say that schemes could not be devised to force the motorist into compliance. Two such schemes come to mind.

-Setting up of a nationwide system of regular inspections for auto exhaust emissions, making it illegal to drive a car not meeting the standards.

-Make automobile warranties invalid unless the owner returned his auto to his dealer at regularly scheduled intervals for the required maintenance work.

With the latter option the manufacturer would likely pick up the cost of the maintenance-the replacement of the catalyst-as is done with other warranty work. If so, the increased warranty expense would be reflected in a higher purchase price. As such we feel that the "+30%" investment cost forecast will more than capture any effect which increased maintenance costs might have on auto sales.

II. Price Increases: The Theory of Profit Maximization

The problem we must now face can be stated in its simplest form as follows: if the production cost of each and every auto produced in 1975 is $X higher than it otherwise would have been in the absence of emmission standards,by how much will unit price be higher than it otherwise would have been, and by how much will auto sales be lower than they otherwise would have been as a result of this price increase.

The assumption that the cost of each automobile is to be increased by an identical $X should in no way lead us to assume that the price of each (or any) automobile will be increased by the full $X amount; or that each price-size category of automobile will pass on the same proportion of the $X cost increase in the form of identical price increases. Furthermore, earlier investigations lead us to conclude that the elasticity of demand - the per cent decrease in quantity purchased observed for a given percentage increase in price - is smaller the more expensive the category of automobile. This conclusion is consistent with our intuition as we realize that one of the very reasons people buy (say) Cadillacs is that they are expensive and thus a status symbol. Thus we would expect a given percentage increase in price to result in a smaller decrease in sales of luxury automobiles than in sub-compacts. (Note that even if Cadillac and Vega prices were increased by the same $ amount, that the percent increase in the price of the Cadillac would be less than one half of the percent increase in the price of the Vega; thus even equal price elasticities would result in a smaller decrease in the number of Cadillacs than of Vegas sold).

If the automobile industry were characterized by vigorous competition - a large number of small firms competing with respect to price, each firm operating near the minimum of a U shaped ATC curve, speedy entry (and exit) of firms, etc. - we would expect the increase in cost to be passed on completely (no more, no less) for each model, with the only differential effects on sales coming from each model's differing price elasticity. Such is not the case, however.

The U.S. automobile industry is the classic textbook example of the non-competitive industry. The industry is made up of one strong firm, GM; two reasonably healthy firms, Ford and Chrysler; and one weak firm, American Motors Corp. Price competition with respect to manufacturer's suggested retail price is as unlikely to occur as the successful entry of another domestic producer into the U.S. market. All firms operate except in the very best of years with significant amounts of unused capacity, i.e., on the falling portions of their ATC curves. Industry pricing policies can be simulated equally well with each of several models, none of which bear striking resemblance to the standard competitive model. General Motors is

recognized as the industry "price leader" in each price category. GM may be seen as choosing the price in each category, given its share of U.S. demand in that market, in such a way as to maximize its total corporate profits from the sale of automobiles. (Note that GM in its pricing policies cannot afford to ignore the cross price elasticities of demand between categories of auto sales.) GM's competitors in each category may then be seen as accepting the price set by GM and competing among themselves (and GM) for the remainder of the quantity demanded at that price by the public. The question of how much of the $X cost increase is passed on to the consumer in each sales category then reduces itself to the question of how GM reacts to such cost increases.

It is clear that GM, recognizing its dominant position in the industry and the industry's time-honored practice of avoiding price competition, has historically practiced various forms of mark-up pricing, probably on a model by model basis. GM is in a position where it can take into account both the phase of the business cycle - the degree to which further reductions in unit sales (due to a price increase) would increase its average unit costs given the shape of its cost curve and its degree of capacity utilization - and the elasticity of demand for each auto category in determining the percentage of per unit increases in costs to pass on to consumers in the form of higher prices. If this is the case, it would not be surprising if the industry, taking GM's lead, would ultimately pass on in the form of higher prices (say) X % of the 1975 cost increases for luxury cars but only (say) .9X % for compact cars.

Unfortunately hard historical evidence is wholly lacking as to the percentage of the cost of specific "extra items" which the automobile industry has passed on in the form of higher prices to consumers. The data on the cost increases themselves, much less the corresponding price increases, are unavailable from published sources.

In view of the above data limitation we are forced to rely on a more theoretical approach to the problem of estimating the proportion of the identical cost increases which will be passed on in the form of higher prices in each of the S-P categories. Briefly, our approach is as follows:

1) We assume that the automobile industry behaves with respect to its pricing policy as if it were under the control of one firm, the leader.

2) We estimate industry demand equations for each of the S-P categories of automobiles. These equations enable us to explain annual levels of S-P category NPCR's as a function of the category's (own) prices, other categories' prices, and various macroeconomic variables.

3) We assume that the prices in all five categories are under the control of the industry leader. He chooses all five prices simultaneously such as to maximize total industry profits.

The normal theory of profit maximization for a monoplist producing one good states that he should produce up to that point at which the marginal cost of producing one more unit of output, MC, is equal to the addition to total revenue (the marginal revenue), MR, which results from selling that output. Or symbolically, he should produce up to that point at which MC = MR. It can be shown that:

$MR = p\ (1 + \frac{1}{E})$, where E is the elasticity of (own price) demand, i.e., the percent decrease in sales of product X as the price of X goes up by 1%.

Thus: $MC = p(1 + \frac{1}{E})$ and $\frac{MC}{1 + 1/E} = p$.

If we take the total derivative of this function we determine the relationship between changes in marginal cost and the (profit maximizing) response in price. First rewrite -

$MC = p(1 + \frac{1}{E})$ as $MC = \eta\, p$ where $\eta = \frac{E+1}{E}$ $(E < 0)$; then $\Delta MC = \eta \Delta p + p \Delta \eta$.

Notice that the more elastic is the demand curve (at the initial price) the smaller is the proportion of Δ cost passed-on; and also that the greater the change (increase in absolute value) in E as the price rises, the smaller the proportion of Δ cost passed-on.

The assumption by the CEQ that the per unit increase in costs due to the new standards is invariant with respect to output, means that the increase may be thought of as a constant absolute increase to average variable cost. If we assume that marginal cost is constant (with respect to output) for the automobile industry, then MC = AVC, and the constant addition to the constant (re output) AVC, may be treated as a constant addition to MC, i.e., our Δ MC of the above equations.

Before concluding this section one additional complication should be noted. As mentioned in item (3) above, the industry leader is assumed to price not to maximize profits in each individual S-P category but to maximize joint profits across the S-P classes. Given that this is the case, the pricing decision in each category cannot depend solely upon the own price elasticity, E, but must also depend upon the cross price elasticity between S-P categories i.e., the response of sales in category 1 to the price in category 2, etc. This factor is taken into account in this investigation by the inclusion of the relevant cross price elasticities in the demand equations for each of the size-price categories.

Table 3-3

Composition of Five Size-Price Categories of Automobiles

Category	Short Description	Representative Models Included
I	Sub-Compact	Rambler American, Pinto, Vega, Maverick, etc.
II	Regular Compact	Ambassador/Rebel, Javelin, Dart, Satellite, Falcon, Mustang, Torino, Chevelle, Camaro, etc.
III	Compact Intermediates and Standard-Sized Regulars	Galaxie, Impala, Firebird, Bel Air, etc.
IV	Full-Sized Intermediates, All Station Wagons, Top-of The-Line Regulars	AMX, Polara, Monaco, Newport, LTD, Monterey, Montego, Cougar, LeSabre, Wildcat, Caprice, Delta 88, Catalina, etc.
V	Top-of-the-Line Intermediates and Luxury	Chrysler 300, New Yorker, Thunderbird, Marquis, Electra, Riviera, Olds 98, Bonneville, Grand Prix, Corvette, Lincoln Continental, Imperial, Cadillac.

III. Estimates of Demand Relationships and of Changes in Prices by Size-Price Category

The theory developed in the previous section suggests a method for determining the changes in prices which will occur for a given change in marginal costs for each size-price classification. In reality, the actual calculations are quite complicated because of the multiplicity of cross-elasticities between different types of cars, and all these relationships must be taken into account simultaneously.

In a nutshell, the problem is as follows: Elasticity calculations are usually made by determining the percentage change in quantity per unit percentage change in price, holding all other variables constant. However, we do not have the luxury of performing this calculation, since prices of all types of cars are changing at the same time. Thus we must determine simultaneously shifts along the demand curve and shifts of the curve itself. However, we must also distinguish between these two shifts and not lump them together as a misnamed "change in elasticity". The problem is illustrated in Fig. III. 1.

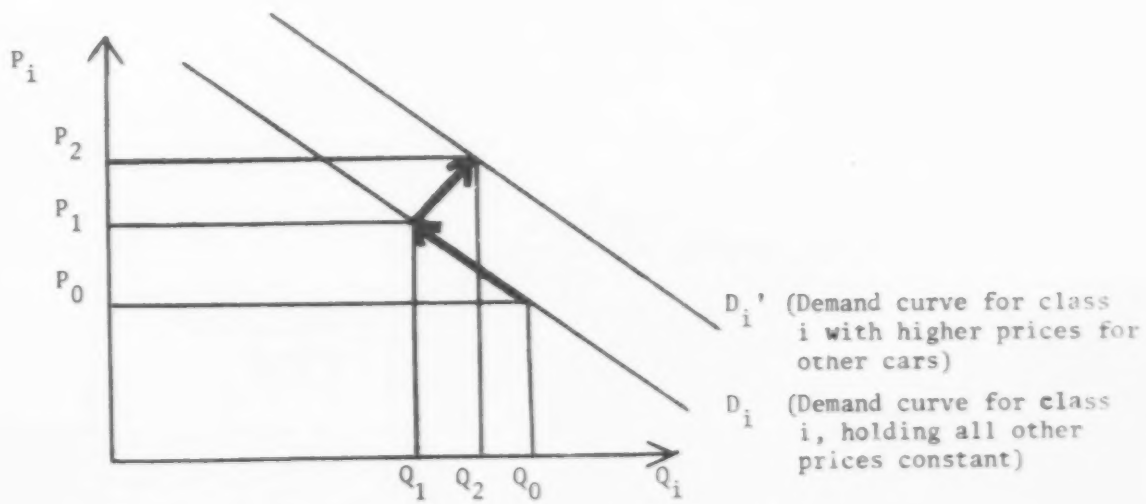

Figure III. 1

where

(P_0, Q_0) is situation before additional costs

(P_1, Q_1) is the new position which would occur if prices of the $i^{\underline{th}}$ class of car were increased and no other prices changed

(P_2, Q_2) is the actual position which does occur because the price of all other cars has also risen.

In estimating these changes, what we have effectively done is to move from position 0 to position 1, and thence to position 2, although in actuality this is done simultaneously.

There are several points to be considered:

1) As mentioned previously, the ratio of price to marginal cost, which is $\frac{E}{E+1}$ ($E < 0$) is <u>always</u> greater than unity for any negatively sloped demand curve. However, in the real world we observe that firms usually raise their prices <u>less</u> than the change in costs. This can occur only if the elasticity at the new price is higher than at the old price. This result will be obtained if we use linear demand functions, which we have done in this study. By comparison, elasticities by definition remain constant for all levels of prices in logarithmic demand curves.

2) If we moved from Q_0 to Q_2 directly, we would find in many cases that the elasticity of demand is less than unity, since the overall price elasticity for cars is estimated to be -0.7. No profit-maximizing company ever produces on the inelastic part of their demand curve. Thus we must estimate both the elasticity <u>along</u> the demand curve and the change in elasticity in order to calculate correctly the proportion of the change in costs which will be passed along as price increases.

3) We have estimated share equations (instead of levels of sales) for two reasons. First, the proportion factors will have the same units as relative prices. If we did not observe this convention the elasticities would decrease over time. Second, by using share equations we reduce the expected size of the residual between car sales as estimated by the share equations and estimated by the equation in the macromodel.

We now proceed to the actual extimation of the pass-along percentages. From the previous section we have:

$$MC = \eta p, \text{ where } \eta = \frac{E+1}{E}$$

Thus $\Delta MC = \eta \Delta p + p \Delta \eta$, or

$$\frac{\Delta P}{\Delta MC} = \frac{1 - (\frac{P}{\Delta MC}) \Delta \eta}{\eta}$$

The change in marginal costs is taken directly from the figures given by CEQ and EPA.

The pre-pollution control price is given by taking the 1970 price for each category and multiplying it by the ratio of the overall price of new cars in year t divided by the price of new cars in 1970. In practice this method

works very well when tried for the 1960's. The only modification to this method is that the price of classes I and II are raised proportionately more in 1971 and 1972 to account for the import surcharge and revaluation on imports.

Table 3-4below lists baseline prices for all cars and for the 5 categories. In addition it lists baseline forecasts for total NPCR's and the aggregate unemployment rate, as these variables are required when we forecast baseline category shares using the 5 equations listed on page II-14.

Table 3-4

BASELINE PREDICTIONS OF AUTO PRICES
By Size Price Category
1970-1980

Year	P_{CINC}	P_A	P_1	P_2	P_3	P_4	P_5	C_A	UN
1970	107.6	3167	1927	2554	2976	3432	5123	8.44	5.0
71	112.2	3302	2076	2690	3080	3552	5302	10.32	5.9
72	108.4	3191	2140	2650	2932	3381	5047	11.17	5.4
73	111.9	3294	2209	2736	3027	3490	5210	11.91	4.9
74	115.7	3405	2284	2829	3130	3608	5387	12.37	4.7
75	121.3	3570	2395	2966	3281	3783	5648	12.67	4.8
76	125.9	3706	2486	3078	3405	3926	5862	13.28	4.4
77	130.1	3829	2569	3181	3519	4057	6057	13.51	4.4
78	133.4	3926	2634	3262	3608	4160	6211	13.72	4.5
79	135.4	3985	2673	3311	3662	4222	6304	13.99	4.6
80	136.1	4006	2687	3328	3681	4244	6337	14.26	4.6

Calculating the elasticities is another matter. As mentioned above, we must calculate the change in elasticities <u>along</u> the demand curve, then estimate how much the curve has shifted.

The general share equation is of the form

$$\frac{C_i}{CA} = K_i - b_i \frac{P_i}{P_j}$$

where K_i are all non-price terms (constants, time trends, etc.)

By the usual definition of elasticity

$$E = \frac{b_i \ (P_i/P_j)}{C_i/CA}$$

Since we are in the first step considering a movement <u>along</u> the demand curve,

we must hold P_j and C_A constant. Hence:

$$E = \left(\frac{b_i C_A}{P_j}\right)\left(\frac{P_i}{C_i}\right)$$

If we now denote the elasticity at a higher price by E', then

$$E' = \left(\frac{b_i C_A}{P_j}\right)\left(\frac{P_i'}{C_i'}\right)$$

So that $\frac{E'}{E} = \frac{P_i'/P_i}{C_i'/C_i}$

Thus in order to get E' (and thus $\Delta\eta$) we must calculate P_i'. But, $P_i' = P_i + \Delta P_i$, and, from above $\frac{\Delta p}{\Delta MC} = \frac{1 - \left(\frac{P}{\Delta MC}\right)\Delta\eta}{\eta}$.

In other words, E' depends on P_i', but P_i' depends on E' as well. Thus even if we consider changes in one price, we have a simultaneous relationship to consider.

The problem becomes more complex when we introduce shifts in the demand curve for C_i due to changes in P_j, for the value of C_i' depends on P_j' as well as P_i'. Thus we have to solve a simultaneous nonlinear system of equations which has the following form:

$$\frac{C_i'}{C_A'} = K_i - b_i \frac{P_i'}{P_j'} \qquad \begin{matrix} i = 1,\ldots,5 \\ j \neq i \end{matrix}$$

$$C_A' = \sum_{i=1}^{5} C_i'$$

$$P_i' = P_i + \Delta MC \left[\frac{1-\left(\frac{P_i}{\Delta MC}\right)\Delta\eta_i}{\eta_i}\right] \qquad i = 1,\ldots,5$$

$$\eta_i = \frac{E_i + 1}{E_i} \qquad i = 1,\ldots,5$$

$$\frac{E_i'}{E_i} = \frac{P_i'/P_i}{C_i'/C_i} \qquad i = 1,\ldots,5$$

We now consider the five share equations $\left(\frac{C_i'}{C_A'}\right)$:

$$\frac{C_1}{CA} = .1037 + .0020\ t + .0498\ (FRN) - .1741\ \frac{P_1}{P_3}$$

$$\frac{C_2}{CA} = 1.7889 - .0587\ UN - .5480\ \frac{P_2}{P_1} - .6086\ \frac{P_2}{P_3}$$

$$\frac{C_3}{CA} = 2.7655 - .0067\ t - .3546\ \frac{P_3}{P_2} - 2.2850\ \frac{P_3}{P_4}$$

$$\frac{C_4}{CA} = 0.9035 - .0078\ t - .0140\ UN - .4638\ \frac{P_4}{PA}$$

$$\frac{C_5}{CA} = 0.2782 + .0019\ t + .0022\ UN - .1390\ \frac{P_5}{PA}$$

where $C_{i,t}$ = CA 's in category i in year t (1954 = 1)

$C_{A,t} = \sum_{i=1}^{5} C_{i,t}$

UN_t = U.S. unemployment rate in year t

$P_{i,t}$ = average price of new car in category i in year t

FRN = supply of foreign cars

We solved this system to calculate the percentage pass-along for each size-price category for 1976, when all the anti-pollution devices are scheduled to be included. We then assumed that this same pass-along percentage would hold for all years. The percentages are:

Size-price class of car	Increase in price per unit increase in cost
I	.84
II	.90
III	.90
IV	.90
V	.98

As we have suggested in earlier sections of this report, the pass-along percentage should be higher for cars with lower price elasticities (the more expensive ones). In fact, it could have been greater than unity for luxury cars. Our estimate of 0.98 falls just short of this mark, but is in no way restricted to be less than unity on an a priori basis. Also, as expected, the pass-along percentage for the subcompacts is lower than all other classifications. The impact prices are calculated on the basis of these pass-along percentages and are listed in Table 3-5.

Table 3-5

POLLUTION IMPACT PRICES BY SIZE-PRICE CATEGORY, 1970-1980

	P_1	P_2	P_3	P_4	P_5	P_A	$P_A(-30\%)$	$P_A(+30\%)$
1970	1927	2554	2976	3432	5123	3176	3176	3176
1971	2076	2690	3080	3552	5302	3302	3302	3302
1972	2140	2650	2932	3381	5047	3191	3191	3191
1973	2249	2779	3070	3533	5257	3337	3337	3337
1974	2324	2872	3173	3651	5423	3448	3448	3448
1975	2573	3157	3472	3974	5856	3761	3716	3805
1976	2752	3363	3690	4211	6173	3991	3919	4064
1977	2835	3466	3804	4342	6368	4114	4042	4187
1978	2900	3547	3893	4445	6522	4211	4139	4284
1979	2939	3596	3947	4507	6615	4270	4198	4343
1980	2953	3613	3966	4529	6648	4291	4219	4364

Note: The estimated percent pass-ons in price as a result of the pollution abatement caused increase in costs are 84%, 90%, 90%, 90%, and 98% for classes one through five respectively. The average pass-on is 90%.

Now that we have forecasts for both baseline prices (see Table 3-4) and impact prices (see Table 3-5) by size-price category, it is a simple matter to forecast shares by size-price category, both baseline and impact, by use of the 5 share equations listed on page III-14.

Table 3-6

Shares of Total New Passenger Car Registrations
by Size-Price Category, Baseline and Impact:
1970-1980

	Category 1		2		3		4		5		"Class Zero"	
	Baseline	Impact	B.	I.	B.	I.	B.	I.	B.	I.	B.	I.
1970	.2012	.2012	.2468	.2468	.2570	.2570	.1983	.1983	.0967	.0967	.0	.0
1971	.1718	.1718	.2538	.2538	.2576	.2576	.2146	.2146	.1022	.1022	.0	.0
1972	.1438	.1438	.2667	.2667	.2644	.2644	.2187	.2187	.1064	.1064	.0	.0
1973	.1551	.1594	.2665	.2674	.2573	.2542	.2139	.2144	.1071	.1080	.0	.0016
1974	.1667	.1662	.2665	.2673	.2502	.2472	.2079	.2083	.1086	.1094	.0	.0016
1975	.1700	.1681	.2666	.2696	.2440	.2318	.2001	.2000	.1107	.1141	.0086	.0164
1976	.1720	.1693	.2667	.2711	.2374	.2200	.1968	.1961	.1117	.1175	.0154	.0260
1977	.1740	.1714	.2667	.2709	.2305	.2137	.1885	.1889	.1136	.1183	.0267	.0368
1978	.1760	.1734	.2665	.2706	.2241	.2076	.1789	.1803	.1157	.1201	.0388	.0480
1979	.1781	.1755	.2664	.2704	.2172	.2010	.1693	.1720	.1179	.1220	.0511	.0591
1980	.1800	.1775	.2665	.2705	.2105	.1944	.1611	.1637	.1198	.1238	.0621	.0701

Note: Beginning in 1973 the sum of the five shares as estimated independently from the five share equations is less than 1.0000. It is clear from the behavior of the estimates, that in all likelihood what is being picked up by the equations is the demand for - and most certainly supply of - sub sub compact cars (our Class Zero). These cars are already beginning to be produced, mostly by foreign producers, in the form of so called "motorcycles on wheels". The pollution abatement program is likely to accelerate this development further as very inexpensive autos, likely foreign produced, perhaps with a 10 - 20,000 mile lifetime, are introduced to meet the standards.

IV The Economic Impact

A. Total New Passenger Car Registrations and the Overall Economy

The NPCR equation of the Macroeconomic Model is used to generate four forecasts of new car registrations for the years 1971 through 1980: One for the baseline prices listed in Table 3-4; and three for the three alternative sets of impact prices listed in Table 3-5.

Table 3-7

New Passenger Car Registrations 1970-1980 (in millions)

Year	Baseline	Impact (100%)	Impact (-30%)	Impact (+30%)
1970	8.44	8.44	8.44	8.44
1971	10.32	10.32	10.32	10.32
1972	11.17	11.17	11.17	11.17
1973	11.91	11.83	11.83	11.83
1974	12.37	12.30	12.30	12.30
1975	12.68	12.36	12.44	12.27
1976	13.31	12.89	13.00	12.77
1977	13.60	13.27	13.35	13.18
1978	13.90	13.65	13.72	13.59
1979	14.24	14.04	14.09	13.99
1980	14.53	14.35	14.40	14.30

In accordance with the request of The Council on Environmental Quality we have adjusted our baseline forecasts in such a way as to remove the "growth recession" we had been forecasting for the period 1974-1975. This has been achieved by adding a mix of countercyclical fiscal and monetary policies to the exogenous policy assumptions which underlie our model. On the following page we present a summary of our forecasts, both baseline and impact, of macroeconomic behavior for the period 1971-1980.

In the Appendix we present more fully the macroeconomic picture for the baseline and three alternative impact runs. In PartI, Executive Summary, we interpret more fully the economic meaning of the results presented in Table 3-8.

Table 3-8

Macroeconomic Performance 1970-1980

Variable	Assumptions	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
GNP Current $	Baseline	974.1	1050.3	1147.1	1266.8	1374.2	1477.7	1608.0	1742.6	1881.3	2028.2	2182.1
	Impact (100%)	"	"	"	1266.5	1373.5	1476.3	1604.7	1738.2	1877.1	2024.5	2178.5
	Impact (+30%)	"	"	"	1266.5	1373.5	1475.9	1603.8	1737.5	1876.8	2024.6	2178.7
	Impact (-30%)	"	"	"	1266.5	1373.5	1476.5	1605.5	1739.3	1878.2	2025.5	2179.4
Consumption Current $	x	615.9	664.9	718.4	786.2	858.9	926.4	1000.3	1082.2	1163.5	1244.6	1328.0
	x	"	"	"	786.2	858.6	925.8	1001.4	1078.9	1159.6	1240.7	1324.3
	x	"	"	"	786.2	858.6	925.6	1001.0	1078.4	1159.3	1240.7	1324.6
	x	"	"	"	786.2	858.6	925.8	1001.8	1079.7	1160.6	1241.7	1325.3
Gross Private Investment Current $	x	135.2	151.9	174.9	201.5	215.6	227.9	254.9	282.1	306.8	333.6	362.5
	x	"	"	"	201.4	215.4	227.5	253.9	281.5	307.0	334.3	363.2
	x	"	"	"	201.4	215.4	227.4	253.6	281.4	307.1	334.6	363.3
	x	"	"	"	201.4	215.4	227.6	254.2	281.7	307.0	334.1	363.0
Net Exports of Goods and Services Current $	x	3.9	1.0	3.5	3.7	1.8	1.3	.7	-.6	-.5	1.3	3.9
	x	"	"	"	3.6	1.7	.9	.2	-1.0	-.9	.8	3.2
	x	"	"	"	3.6	1.7	.8	.0	-1.1	-1.1	.6	3.0
	x	"	"	"	3.6	1.7	1.0	.3	-.9	-.8	.9	3.4
Index of Capacity Utilization	x	82.7	81.8	85.6	89.7	91.5	91.1	92.6	93.0	93.0	93.2	93.5
	x	"	"	"	89.6	91.4	90.8	92.3	92.9	93.1	93.4	93.7
	x	"	"	"	89.6	91.4	90.7	92.2	92.9	93.1	93.5	93.7
	x	"	"	"	89.6	91.4	90.9	92.4	92.9	93.1	93.3	93.7
GNP in 1958 $	x	720.0	741.9	785.7	836.1	875.5	906.6	952.8	996.2	1038.4	1083.4	1131.1
	x	"	"	"	835.9	875.1	906.0	951.5	995.7	1039.7	1086.0	1134.3
	x	"	"	"	835.9	875.1	905.7	951.1	995.7	1040.1	1086.6	1134.8
	x	"	"	"	835.9	875.1	906.1	952.0	996.0	1039.5	1085.4	1133.5

Table 3-8 (Cont'd)

Macroeconomic Performance 1970-1980

Variable	Assumptions	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
Corporate	Baseline	75.3	81.8	95.3	109.5	123.7	132.8	147.1	158.7	170.6	184.5	199.8
Profits	Impact (100%)	"	"	"	109.3	123.5	132.1	146.2	157.9	170.1	184.1	199.4
w/0 IVA Adj.	Impact (+30%)	"	"	"	109.3	123.5	132.0	146.0	158.0	170.1	184.1	199.5
	Impact (-30%)	"	"	"	109.3	123.5	132.3	146.5	158.2	170.2	184.2	199.5
Unemployment	Rate	5.63	6.83	5.82	4.67	4.00	4.07	3.46	3.36	3.43	3.39	3.37
Mfg. Sector		"	"	"	4.70	4.03	4.15	3.57	3.41	3.41	3.35	3.33
		"	"	"	4.70	4.03	4.19	3.59	3.41	3.40	3.33	3.32
		"	"	"	4.70	4.03	4.13	3.54	3.40	3.41	3.36	3.34

B. Industry Impacts

The complete Chase Econometrics Long Range Interindustry Forecasting System was run both on the basis of the baseline and of the impact price series for new passenger cars. In Table 3-10 we list the values of important variables under both solutions for those industries significantly affected by the level of new passenger car sales.

In the Appendix we present more fully the industry by industry picture for the baseline and three alternative impact runs. In Part I, Executive Summary, we interpret more fully the economic meaning of the results presented in Table 3-10.

Table 3-9

Industries Significantly Affected by Changes
in Annual Levels of New Passenger Car Registrations

Name	SIC Classification	I/O Classification	Comment
Motor Vehicles and Equipment	371	59	
Primary Iron and Steel Manufacturing	331,332,339	37	
Primary Nonferrous Metals Mfg.	333,334,335 3392	38	
Fabricated Metal Products	34	39 through 42	
- Screw Machine Products, Bolts, Nuts, Metal Stampings	345,346	41	Automobile Stampings
Machinery Except Electrical	35	43 through 52	
- Metalworking Machinery and Equipment	35	47	Machine Tools
- General Industrial Machinery and Equipment	356	49	Ball and Roller Bearings
- Miscellaneous Machinery, Except Electrical	359	50	Machine Shop Products
Electrical Machinery	36	53 through 58	
- Miscellaneous Electrical Machinery and Equipment	369	58	Storage Batteries, Electrical Equipment for Internal Combustion Engines
Textile Mill Products	22	16,17	
- Miscellaneous Textile Goods and Floor Coverings	227,229	17	Tire Cord and Fabric, Automotive Upholstery Items

Table 3-9 (Cont'd)

Name	SIC Classification	I/O Classification	Comment
Apparel and Related Products	23	18,19	
- Miscellaneous Fabricated Textile Products		19	Upholstery Items and Materials
Chemical and Allied Products	28	27 through 30	
- Plastics and Synthetic Materials	282	28	
- Paints and Allied Products	285	30	
Rubber and Miscellaneous Plastic Products	30	32	Tires; Plastic Automotive Items
Stone, Clay and Glass Products	32	35,36	
- Glass and Glass Products	321-323	35	Windows and Windshields
Petroleum Refining and Related Industries	29	31	

Table 3-10

Industry Performance: 1970-1980

Variable	Industry SIC	Assumption	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
Sales FTC-SEC, Constant $	371	Baseline	50.24	59.36	66.63	71.68	74.05	75.25	81.55	83.04	84.93	87.84	90.42
		Impact(100%)	"	"	"	71.38	73.82	74.22	80.22	82.27	84.52	87.52	90.05
	331, 332, 339		23.96	23.35	26.12	29.52	29.99	29.33	31.09	32.48	32.93	33.68	34.73
			"	"	"	29.46	29.91	29.13	30.76	32.30	32.98	33.85	34.88
	333, 334 335, 3392		16.81	17.09	18.91	21.19	21.99	22.05	23.49	24.50	25.18	26.09	27.20
			"	"	"	21.16	21.96	21.96	23.34	24.43	25.25	26.22	27.32
	34		30.93	32.41	35.75	39.41	41.63	43.38	47.04	49.78	52.35	55.36	58.53
			"	"	"	39.38	41.59	43.27	46.89	49.74	52.47	55.59	58.78
	35		50.81	48.67	53.88	61.11	65.73	67.62	72.54	76.79	79.75	83.42	87.42
			"	"	"	61.07	65.64	67.44	72.17	76.56	79.82	83.73	87.80
	36		66.83	69.46	80.35	93.38	101.10	106.07	117.26	127.39	136.14	146.59	158.47
			"	"	"	93.32	100.98	105.83	116.76	127.17	136.45	147.20	159.03
	22		20.85	22.26	24.28	26.16	27.79	28.62	30.67	32.05	33.41	34.95	36.58
			"	"	"	26.14	27.78	28.56	30.58	32.06	33.51	35.09	36.73
	23		19.83	20.08	22.02	24.15	25.75	26.39	28.04	29.26	30.38	31.55	32.83
			"	"	"	24.13	25.73	26.34	27.95	29.23	30.45	31.68	32.99
	28		56.92	58.98	66.05	72.57	76.80	78.79	84.65	87.83	91.47	95.84	100.66
			"	"	"	72.53	76.76	78.69	84.51	87.92	91.84	96.36	101.20
	30		15.35	16.20	17.56	18.58	18.50	17.96	19.19	19.26	19.64	20.21	21.00
			"	"	"	18.56	18.48	17.89	19.13	19.33	19.80	20.40	21.17
	32		15.50	15.83	17.89	19.73	20.53	21.35	23.33	24.77	26.05	27.52	28.90
			"	"	"	19.71	20.51	21.30	23.25	24.77	26.15	27.66	29.03
	29		63.40	67.96	73.39	80.05	84.75	88.31	94.20	98.88	103.61	109.02	114.96
			"	"	"	80.03	84.72	88.26	94.12	98.94	103.88	109.44	115.43

Table 3-10 (Cont'd)

Variable	Industry SIC	Assumption	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
Profits Before Taxes	371	Baseline	2.16	5.76	6.78	7.12	6.94	6.66	7.32	7.05	6.98	7.10	7.17
		Impact(100%)	"	"	"	7.08	6.92	6.51	7.16	7.01	7.00	7.13	7.18
	331, 332		.99	1.25	1.78	2.18	2.06	1.87	2.15	2.26	2.23	2.30	2.41
	339		"	"	"	2.17	2.05	1.85	2.11	2.26	2.26	2.33	2.43
	333, 334		1.87	1.17	1.48	1.75	1.77	1.83	2.12	2.30	2.44	2.64	2.85
	335, 3392		"	"	"	1.74	1.76	1.82	2.10	2.30	2.46	2.65	2.86
	34		2.04	2.10	2.58	2.97	3.17	3.34	3.66	3.96	4.18	4.49	4.83
			"	"	"	2.97	3.17	3.32	3.63	3.95	4.19	4.53	4.87
	35		5.32	4.43	4.93	5.96	6.66	7.05	8.19	8.87	9.56	10.41	11.24
			"	"	"	5.95	6.65	7.03	8.13	8.84	9.57	10.44	11.27
	36		4.31	4.70	5.74	6.70	6.92	7.00	8.00	8.58	9.10	9.83	10.64
			"	"	"	6.70	6.91	6.98	7.96	8.58	9.15	9.89	10.69
	22		.88	.96	1.30	1.49	1.55	1.51	1.74	1.85	1.90	2.03	2.16
			"	"	"	1.48	1.55	1.50	1.72	1.86	1.92	2.04	2.16
	23		.82	.83	1.05	1.21	1.36	1.49	1.71	1.90	2.05	2.22	2.38
			"	"	"	1.21	1.36	1.49	1.70	1.89	2.04	2.21	2.36
	28		6.18	6.33	8.14	9.23	9.34	9.09	10.18	10.43	10.71	11.34	11.97
			"	"	"	9.22	9.33	9.07	10.16	10.46	10.79	11.40	11.99
	30		.85	1.02	1.08	1.15	1.16	1.18	1.33	1.33	1.54	1.68	1.85
			"	"	"	1.15	1.16	1.17	1.33	1.34	1.55	1.69	1.86
	32		1.16	1.21	1.70	1.73	1.75	1.82	2.07	2.16	2.36	2.55	2.62
			"	"	"	1.73	1.75	1.82	2.06	2.16	2.36	2.56	2.63
	29		7.04	7.35	7.75	8.60	9.26	9.74	10.38	11.00	11.53	12.19	12.94
			"	"	"	8.60	9.26	9.74	10.36	11.00	11.57	12.27	13.03

Table 3-10 (Cont'd)

Variable	Industry SIC	Assumption	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
Production Workers (1000's)	371	Baseline	613	690	732	751	749	738	771	765	759	760	757
		Impact (100%)	"	"	"	748	747	727	756	754	751	753	751
	331, 332 339		689	660	667	708	734	748	792	836	859	885	914
			"	"	"	707	732	745	786	832	859	886	916
	333, 334 335, 3392		349	322	317	334	335	332	349	368	382	398	418
			"	"	"	334	334	331	347	367	382	400	420
	34		1055	1019	1054	1096	1105	1106	1145	1162	1175	1195	1216
			"	"	"	1096	1104	1104	1141	1161	1177	1199	1220
	35		1310	1174	1249	1400	1487	1507	1579	1637	1661	1695	1733
			"	"	"	1399	1486	1506	1575	1635	1664	1703	1742
	36		1264	1187	1282	1417	1432	1409	1491	1550	1581	1635	1704
			"	"	"	1416	1430	1406	1485	1549	1587	1645	1712
	22		847	832	851	875	887	882	894	901	903	907	914
			"	"	"	874	886	881	893	901	905	910	917
	23		1214	1254	1293	1350	1401	1419	1454	1484	1509	1533	1562
			"	"	"	1350	1400	1418	1451	1482	1511	1538	1568
	28		606	582	593	617	636	645	663	679	690	702	715
			"	"	"	617	636	644	662	678	690	703	717
	30		436	451	498	554	595	625	673	701	728	756	784
			"	"	"	553	595	624	671	701	729	758	787
	32		507	497	507	523	522	521	538	546	551	557	564
			"	"	"	523	522	521	538	547	553	560	567
	29		117	116	112	109	105	102	99	95	92	89	85
			"	"	"	109	105	102	99	95	92	89	85

Table 3-10 (Cont'd)

Variable	Industry SIC	Assumption	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
Overhead Workers (1000's)	371	Baseline	197	199	209	222	233	241	254	264	272	280	287
		Impact (100%)	"	"	"	221	232	239	251	260	269	277	284
	331, 332, 339		166	160	165	174	182	188	195	204	212	220	229
			"	"	"	173	182	187	194	203	211	220	229
	333, 334 335, 3392		102	99	102	110	117	121	128	135	141	148	155
			"	"	"	110	116	121	127	134	141	148	155
	34		331	317	312	314	319	325	336	349	363	379	397
			"	"	"	314	319	325	335	348	363	379	398
	35		654	612	657	737	821	893	970	1049	1124	1201	1283
			"	"	"	737	820	892	968	1047	1124	1203	1287
	36		649	598	573	576	592	612	650	704	767	843	935
			"	"	"	576	592	611	649	702	766	844	938
	22		118	117	120	125	131	136	141	147	153	159	165
			"	"	"	125	131	135	141	147	153	159	165
	23		171	171	175	183	190	196	202	209	214	220	226
			"	"	"	183	190	196	202	208	214	220	227
	28		451	433	454	484	515	546	581	616	652	690	729
			"	"	"	484	515	546	581	616	652	690	730
	30		135	132	149	169	190	208	229	249	269	289	309
			"	"	"	169	190	208	229	249	269	289	310
	32		131	130	133	138	143	147	152	158	163	168	174
			"	"	"	138	143	147	152	157	163	168	174
	29		75	75	74	73	71	70	69	67	65	64	62
			"	"	"	73	71	70	69	67	65	64	62

Table 3-10 (Cont'd)

Variable	Industry I/O	Assumption	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
Shipments, Constant $	41	Baseline	7.78	8.31	8.98	9.79	10.43	10.90	11.65	12.27	12.86	13.53	14.25
		Impact (100%)	"	"	"	9.78	10.41	10.84	11.56	12.21	12.83	13.53	14.26
	47		5.35	5.38	6.06	6.99	7.43	7.49	8.02	8.46	8.69	9.00	9.37
			"	"	"	6.98	7.42	7.46	7.96	8.43	8.70	9.05	9.42
	49		6.67	6.71	7.62	8.86	9.38	9.38	10.06	10.67	10.95	11.35	11.84
			"	"	"	8.85	9.37	9.35	10.00	10.64	10.99	11.43	11.92
	50		3.12	3.18	3.38	3.68	3.89	4.04	4.30	4.51	4.70	4.92	5.16
			"	"	"	3.67	3.88	4.01	4.26	4.49	4.69	4.93	5.17
	58		3.11	3.17	3.51	3.90	4.01	3.99	4.25	4.46	4.57	4.71	4.88
			"	"	"	3.90	4.00	3.96	4.21	4.44	4.57	4.72	4.89
	17		6.08	6.87	7.55	8.35	9.11	9.72	10.56	11.37	12.20	13.09	14.08
			"	"	"	8.35	9.10	9.71	10.54	11.36	12.22	13.13	14.12
	19		4.06	4.43	4.79	5.22	5.60	5.82	6.20	6.52	6.83	7.16	7.52
			"	"	"	5.21	5.59	5.80	6.17	6.50	6.84	7.18	7.54
	28		13.30	14.87	17.53	19.86	21.44	22.55	25.63	27.43	29.49	32.04	34.81
			"	"	"	19.84	21.43	22.47	25.52	27.45	29.61	32.19	34.95
	30		2.67	2.92	3.18	3.48	3.56	3.57	3.75	3.91	4.00	4.11	4.24
			"	"	"	3.47	3.56	3.56	3.73	3.90	4.01	4.12	4.25
	35		3.86	4.00	4.41	4.86	5.06	5.13	5.44	5.69	5.86	6.06	6.30
			"	"	"	4.85	5.05	5.11	5.40	5.67	5.87	6.08	6.31

C. Regional Employment Impacts in the Motor Vehicle Industry

Use was made of the 1967 Census of Manufactures in isolating auto industry employment effects throughout the United States. In many instances data suppression made it impossible to isolate employment effects in specific areas or even to allocate them among states. In many cases data is only given for SIC 37 (not SIC 371). In such cases the areas in question were omitted from Table 3-11.

In an attempt to fill in the gaps in the data, information on the distribution of employment was gathered directly from the Big Four. The response was spotty, but was helpful in filling in some of the gaps in our knowledge. Table 3-12 is complete and lists the final assembly points for all U.S. produced 1973 model cars.

Auto employment is located in Toledo and Milwaukee, Wisconsin. One information on Ford's location was necessary to determine that one half of Ford's manufacturing floor space is located in Michigan with fully one half of that total in Dearborn. Chrysler has thirty-one manufacturing plants in addition to their assembly plants listed in Table 3-12. Of these thirty one, twenty one are in Michigan, six in Indiana, two in Ohio, and one in New York. General Motors has 125 plants in seventeen states and sixty nine cities. Of a total 261 million square feet of floor space, 130 million are located in Michigan, Ohio, and Indiana.

When we combine the above data and pieces of information (big four information from the SIC 37 analysis), it is clear that the following areas (in addition to those listed in Table 3-11) will also feel significant employment effects: Georgia, Baltimore, New York (Northern), New Jersey, Missouri (St. Louis), and Kansas.

Particular emphasis should be given to the "SIC 371 Employment as a Per Cent of Total Area Manufacturing Employment" column of Table 3-11. It is clear that significant localized effects on employment will be felt in those areas where manufacturing employment depends heavily upon the automotive industries. To the list of Indianapolis, South Bend, Detroit, Cincinnati, Cleveland, and Toledo, we may feel confident in adding Kenosha, Wisconsin, and other smaller communities heavily dependent upon the existence of one or more manufacturing or assembly plants.

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Table 3-11

The Geographic Distribution of Employment in the Motor Vehicle and Equipment Industry, SIC 371

Area	Area Employment in SIC 371 (1000's)	Area SIC 371 Employment as a Per Cent of Total Area Manufacturing Employment	Area SIC 371 Employment as a Per Cent of US SIC 371 Employment
California	33.2	2.1	4.5
Los Angeles Area	(19.2)	(2.3)	(2.6)
Illinois	22.4	1.0	3.0
Indiana	58.0	3.2	7.8
Northwestern Area	(12.8)	(1.2)	(1.7)
Indianapolis	(16.2)	(12.5)	(2.3)
South Bend	(3.8)	(10.9)	(0.5)
Michigan	241.7	26.7	32.5
Detroit	(157.6)	(27.0)	(21.3)
Ohio	105.9	7.6	14.3
Cincinnati Area	(27.1)	(15.2)	(3.7)
Cleveland	(26.2)	(8.3)	(3.5)
Toledo	(15.2)	(19.6)	(2.1)
Wisconsin	27.1	5.3	3.7

Table 3-12

Final Passenger Car Assembly Locations

Corporation	Location	Model
American Motors Corporation	Kenosha, Wisconsin	All
Ford Motor Corporation	Hapeville, Georgia	Torino
	Chicago, Illinois	Ford
	Dearborn, Michigan	Cougar and Montego
	Claycomo, Missouri	Maverick and Comet
	Lorain, Ohio	Torino and Montego
	Pico-Rivera, California	Ford and Thunderbird
	Louisville, Kentucky	Ford
	Mahwah, New Jersey	Ford
	Edison, New Jersey	Pinto
	Norfolk, Virginia	Ford
	Hazelwood, Missouri	Mercury
	Milpitas, California	Pinto
	St. Paul, Minnesota	Ford
	Wayne, Michigan	Ford
	Wixom, Michigan	
Chrysler Corporation	Belvidere, Illinois	N/A
	Hamtramck, Michigan	
	Detroit, Michigan	
	Los Angeles, California	
	Detroit, Michigan	
	Fenton, Missouri	
	Newark, Delaware	
	New Stanton, Pennsylvania	
General Motors Corporation	South Gate, California	N/A
	Van Nuys, California	
	Fremont, California	
	Kansas City, Kansas	
	Leeds, Missouri	
	St. Louis, Missouri	
	Arlington, Texas	

Table 3-12 Cont'd

Final Passenger Car Assembly Locations

Corporation	Location	Model
General Motors Corporation	Framingham, Massachusetts Tarrytown, New York Linden, New Jersey Wilmington, Delaware Baltimore, Maryland Atlanta, Georgia Doraville, Georgia Janesville, Wisconsin Flint, Michigan Lordstown, Ohio Norwood, Ohio Ypsilanti, Michigan	N/A